

# **National Grid SA-COA** **PRODUCTION FILE**

**Contractor : ABB Contracting Co.**

**Project : SS 8709- 132/13.8kV in Alkhan**

**Contract No : 11131113/00**

**Substation : 8709**

**Subject : 132Kv Busbar Protection Set-1  
Relay Panel-1**



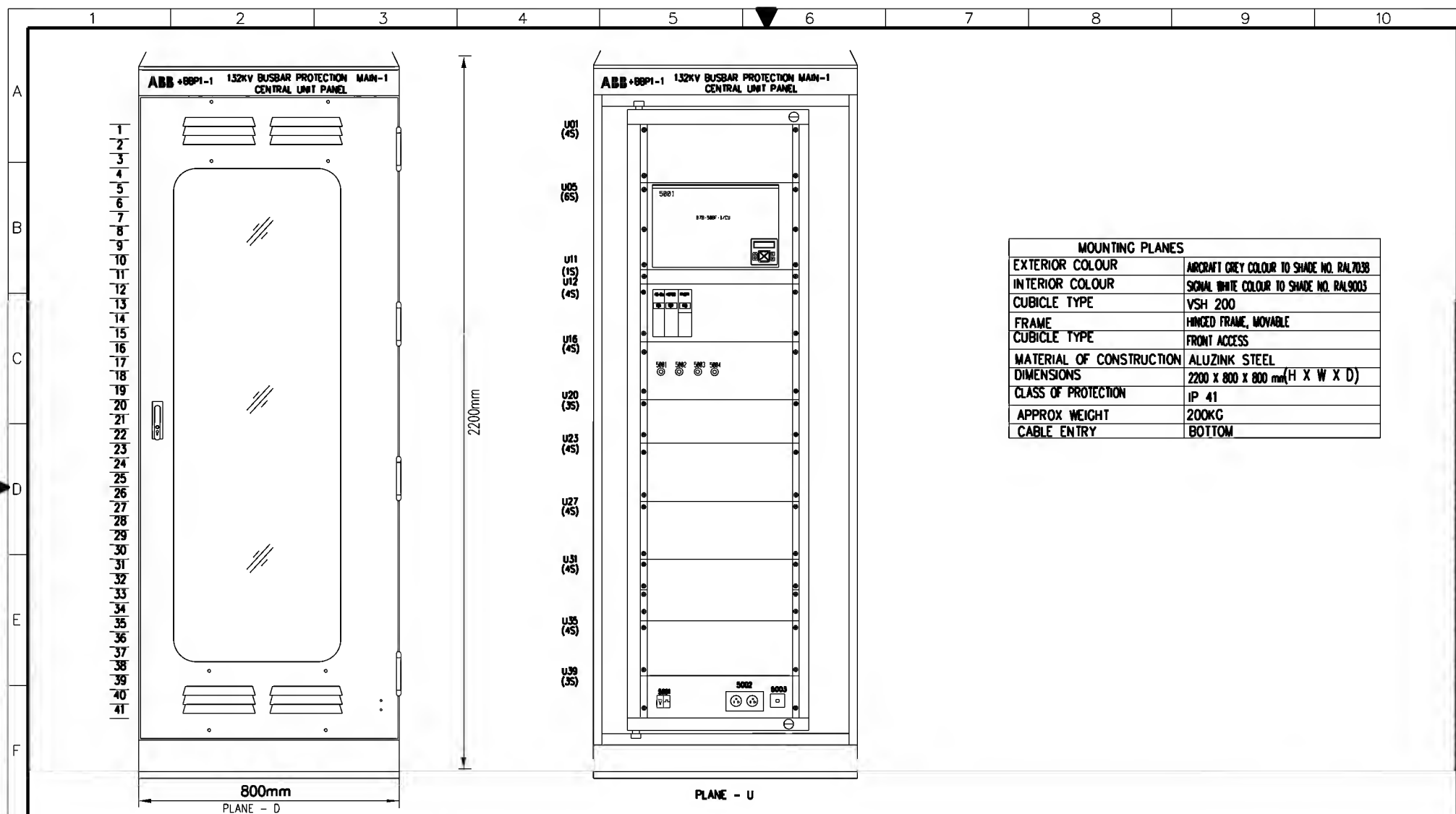


POWER SYSTEMS NETWORK MANAGEMENT  
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS  
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.,  
414, AL-KHARJ ROAD  
SECOND INDUSTRIAL CITY  
RIYADH-11383 K.S.A

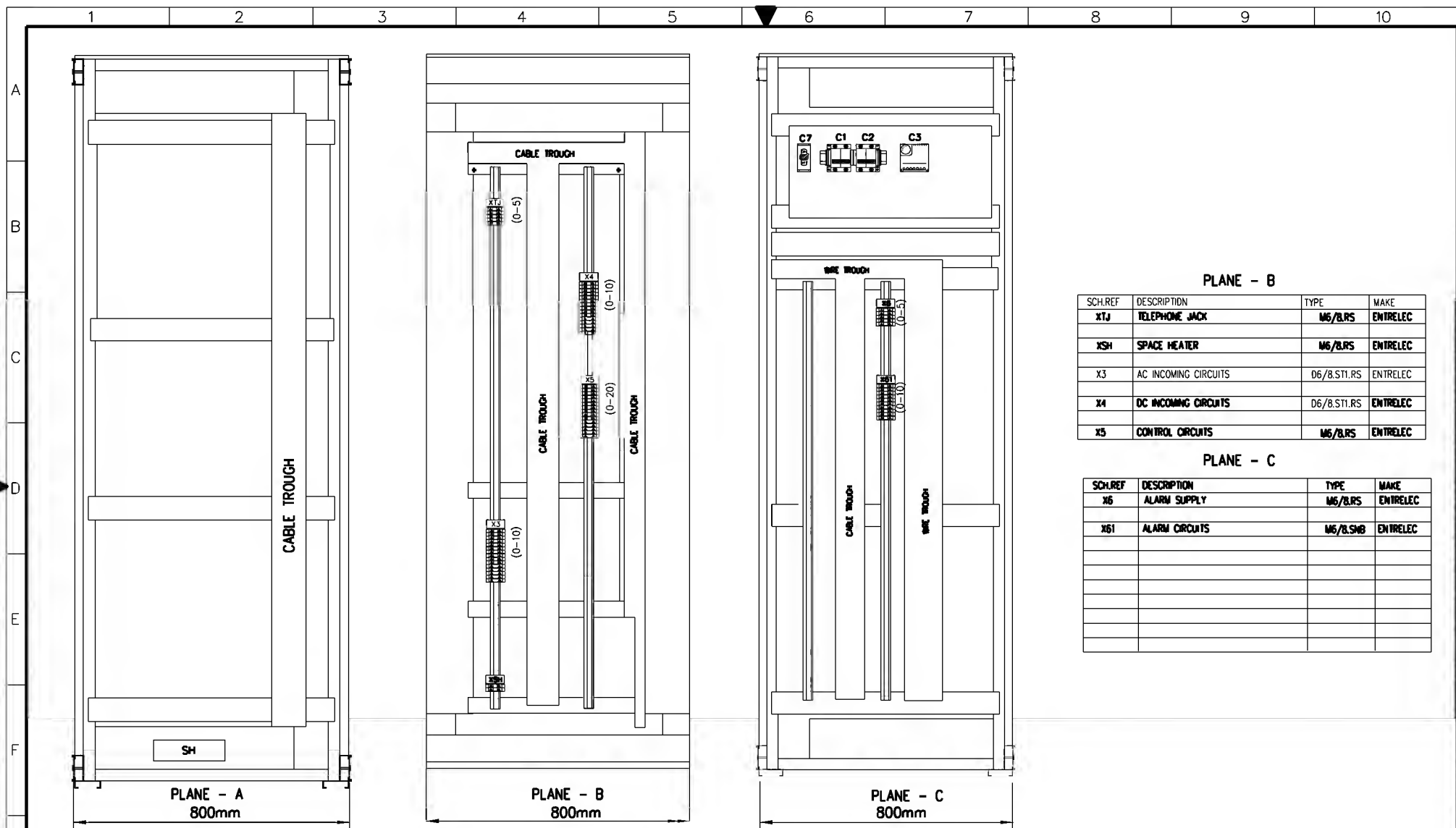
CONTRACTOR : ABB Contracting Company  
CLIENT : National Gridsa  
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY  
SUBSTATION : S/S 8709  
CONTRACT NO. : 11131113/00  
TITLE : Assembly Drawing - +BBP1-1  
[132KV BUSBAR PROTECTION MAIN-1 CENTRAL UNIT PANEL]

AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	COVER SHEET		الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY KVR	132KV BUSBAR PROT.N.MAIN-1 CU PANEL +BBP1-1	National Grid sa			
00	13 04	FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED	S/S 8709 - 132/13.8KV IN AL-KHARJ CITY	INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA	-	C421	CD-322990	000 001



MOUNTING PLANES	
EXTERIOR COLOUR	AIRCRAFT GREY COLOUR TO SHADE NO. RAL7038
INTERIOR COLOUR	SIGNAL WHITE COLOUR TO SHADE NO. RAL9003
CUBICLE TYPE	VSH 200
FRAME	HINGED FRAME, MOVABLE
CUBICLE TYPE	FRONT ACCESS
MATERIAL OF CONSTRUCTION	ALUZINK STEEL
DIMENSIONS	2200 x 800 x 800 mm (H X W X D)
CLASS OF PROTECTION	IP 41
APPROX WEIGHT	200KG
CABLE ENTRY	BOTTOM

AS-BUILT BY _____ DATE _____		CONTRACT NO. <b>11131113/00</b>	JOB ORDER NO. <b>S-13656</b>	<b>ASSEMBLY DRAWING</b>		الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>		DATE STARTED <b>24.01.2013</b> DATE COMPLETED _____		<b>132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1</b>		INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.
DATE STARTED <b>24.01.2013</b> DATE COMPLETED _____		PRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>		<b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b>		-	<b>C421</b>	<b>CD-322990</b>	<b>01</b>
REV. NO. _____ DATE _____		DESCRIPTION _____		<b>RIYADH SAUDI ARABIA</b>		National Grid sa		SHT CONT.	
FACTORY ASBUILT		FOR APPROVAL				G01 G02		01	



PLANE - B

SCH.REF	DESCRIPTION	TYPE	MAKE
XTJ	TELEPHONE JACK	M6/B.RS	ENTRELEC
XSH	SPACE HEATER	M6/B.RS	ENTRELEC
X3	AC INCOMING CIRCUITS	D6/8.STI.RS	ENTRELEC
X4	DC INCOMING CIRCUITS	D6/8.STI.RS	ENTRELEC
X5	CONTROL CIRCUITS	M6/B.RS	ENTRELEC

PLANE - C

SCH.REF	DESCRIPTION	TYPE	MAKE
X6	ALARM SUPPLY	M6/B.RS	ENTRELEC
X61	ALARM CIRCUITS	M6/B.SMB	ENTRELEC

AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL
REV. NO.	DATE	DESCRIPTION

DRAWN BY RIZ CHECKED BY KVR  
 DATE STARTED 24.01.2013 DATE COMPLETED \_\_\_\_\_  
 OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

### ASSEMBLY DRAWING

132KV BUSBAR PROTN.MAIN-I CU PANEL +8BP1-  
 S/S 8709 - 132/13.8KV IN AL-KHARJ CITY  
 RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء



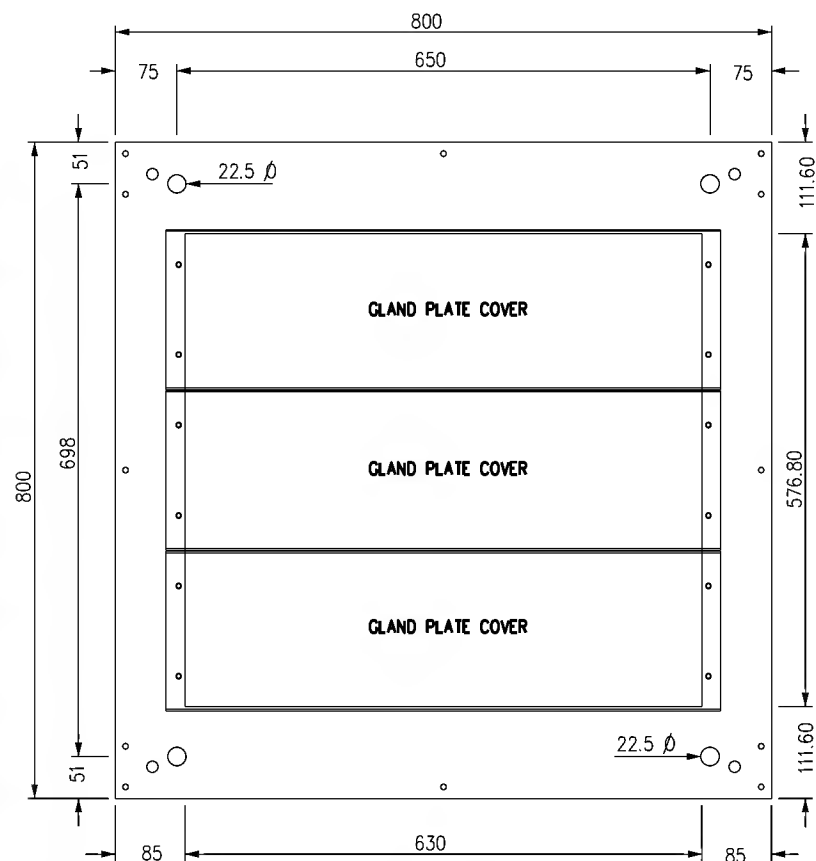
INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
-	C421	CD-322990	SHT 002 CONT. 003	01

DMS

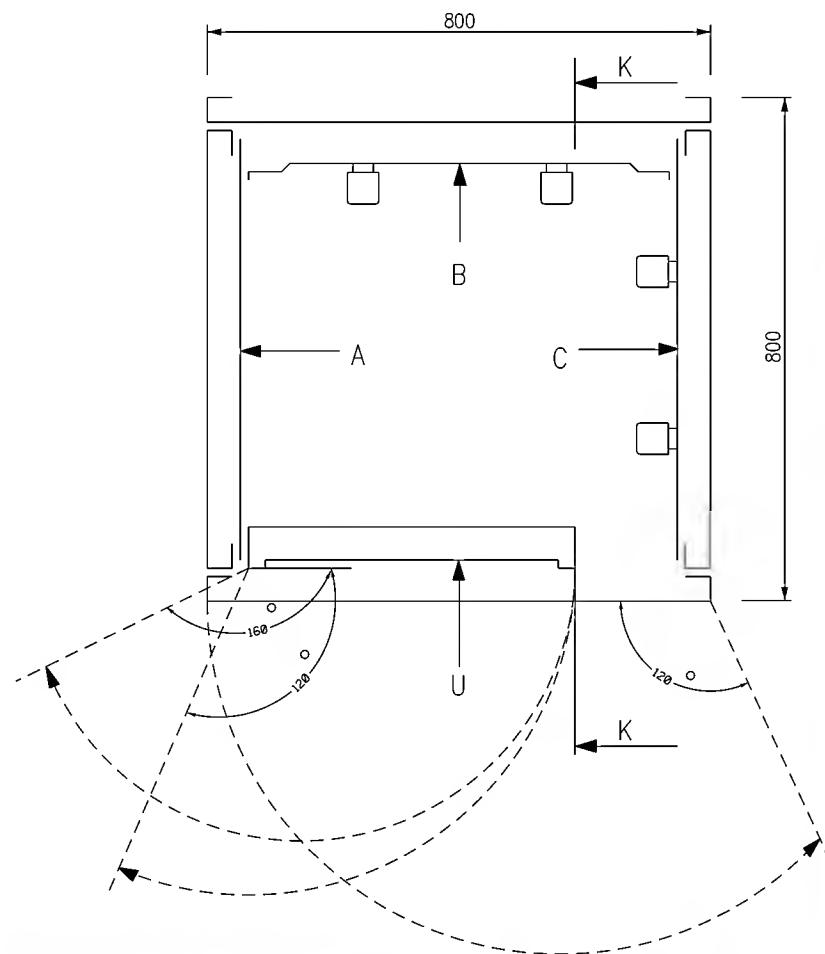
VECTOR

NGD200

# BASE PLATE/ FOUNDATION



# PLAN



AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. **11131113/00** JOB ORDER NO. **S-13656**

01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL
REV. NO.	DATE	DESCRIPTION

DRAWN BY <b>RIZ</b>	CHECKED BY <b>KVR</b>
DATE STARTED <b>24.01.2013</b>	DATE COMPLETED _____
OPRG. DEPT. <b>CTPD</b>	ENG. DEPT. <b>AUT-PSAC</b>

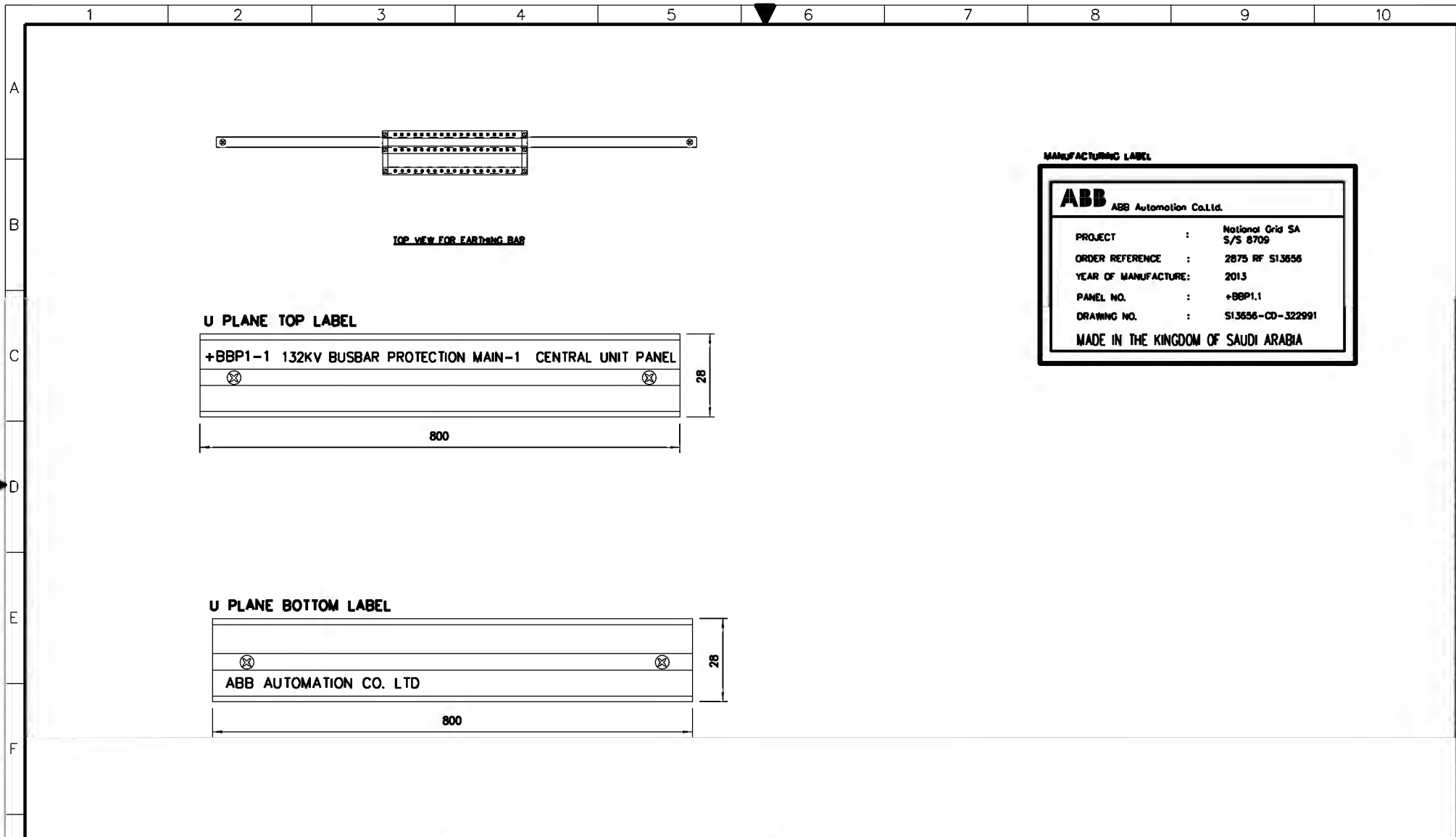
## ASSEMBLY DRAWING

**132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

الشركة الوطنية لنقل الكهرباء



INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
-	<b>C421</b>	<b>CD-322990</b>	<b>G03 G04</b>	<b>01</b>



AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		ASSEMBLY DRAWING		الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
01 13 49			FACTORY ASBUILT		DRAWN BY RIZ CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-		National Grid sa			
00 13 04			FOR APPROVAL		DATE STARTED 24.01.2013 DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		INDEX		PLANT NO.	
REV. NO.			DATE		DESCRIPTION		PRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		DRAWING NUMBER		SHEET NO.	
							RIYADH SAUDI ARABIA		- C421		CD-322990	
									SHT CONT.		REV. NO.	
									G04 L00		01	



POWER SYSTEMS NETWORK MANAGEMENT  
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS  
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD  
414, AL-KHARJ ROAD  
SECOND INDUSTRIAL CITY  
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company  
CLIENT : National Gridsa  
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY  
SUBSTATION : S/S 8709  
CONTRACT NO. : 11131113/00  
TITLE : LIST OF APPARATUS +BBP1-1  
[132KV BUSBAR PROTECTION MAIN-1 CENTRAL UNIT PANEL]

AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	COVER SHEET		الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
DRAWN BY RIZ CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1		INDEX		PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
DATE STARTED 24.01.2013 DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		- C421			CD-322990	SH1	01
DESCRIPTION		RIPYADH SAUDI ARABIA						CONT.	
REV. NO.	DATE	OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC						L00	L01


	1	2	3	4	5	6	7	8	9	10
	SR. NO.	LOC. REF	SCH. REF.	D E S C R I P T I O N		SHEET NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
A				RELAY CUBICLE- -BBP1-1 FOR 132KV BUSBAR PROTECTION MAIN-1			1	VSH 200	ABB	
				ACCOMODATING THE FOLLOWING						
B	1	U05.5001	87B-50BF-1/CU	CENTRAL UNIT FOR NUMERICAL BUSBAR PROTECTION WITH FOLLOWING		234	1	REB 500	ABB	REB500-CU03-V76-
				HIGH RELIABILITY DUE TO TWO INDEPENDENT MEASUREMENT CRITERIA		298-299				S20-P1-B1-CA3-CB1
				STABILIZED DIFFERENTIAL CURRENT ALGORITHM						1MRB1500822M6002
				DIRECTIONAL CURRENT COMPARISON ALGORITHM						1MRB150032R0201/B
				HIGH TROUGH FAULT STABILITY EVEN IN CASE OF CT SATURATION.						
				END FAULT PROTECTION						
				FULL SOLID STATE BUSBAR REPLICA WITHOUT SWITCHING OF CT CIRCUIT.						
				THEREFORE NO CHECK ZONE REQUIRED						
				PHASE SEGREGATED MEASUREMENT						
				REDUCE CT PERFORMANCE REQUIREMENTS						
C				BUILT IN EVENT RECORDER.BUILT IN EVENT DISTURBANCE RECORDER						
				BUILT IN HUMAN MACHINE INTERFACE.FULLY NUMERICAL SIGNAL PROCESSING						
				BINARY INPUT						
				BINARY OUTPUT						
				FULLY NUMERICAL SIGNAL PROCESSING						
				AUX. VOLTAGE						
				RATED FREQUENCY						
	2	U12.101	TS-CU	TEST SWITCH FOR CENTRAL UNIT		232	1	RTXP1B	ABB	RK 926 115-AH
	3	U12.107	K01BB	BISTABLE RELAY		232	1	RXMVB 4	ABB	RK 251 401-AP
				AUXILIARY VOLTAGE						
D				CONTACT DATA						
				FOR BUS IMAGE ALARM						
	4	U12.119	740C-1/CU	DUAL TARGET RELAY REVERSE FLAG " BF/BB CENTRAL UNIT DC SUPPLY FAIL"		232	1	RXSF 1	ABB	RK 271 019-AN
				CONTACT DATA						
	5	U16.5001	1PB1	PUSH BUTTON BLACK COLOUR. WITH 2NO CONTACTS		231	1	ML1-100W	ABB	1SFA 616 100 R1006
										1SFA 616 600 R1102
	6	U16.5002	1PB2	PUSH BUTTON BLACK COLOUR. WITH 2NO CONTACTS		231	1	ML1-100W	ABB	1SFA 616 100 R1006
				FOR EXTERNAL RESET						1SFA 616 600 R1102
	7	U16.5003	S01	PUSH BUTTON BLACK COLOUR. WITH 2NO CONTACTS		232	1	ML1-100W	ABB	1SFA 616 100 R1006
				FOR BBP IN SELECTION						1SFA 616 600 R1102
E	8	U16.5004	S02	PUSH BUTTON BLACK COLOUR. WITH 2NO CONTACTS		232	1	ML1-100W	ABB	1SFA 616 100 R1006
				FOR BBP OUT SELECTION						1SFA 616 600 R1102
F										

AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		LIST OF APPARATUS		الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		INDEX		PLANT NO.	
DATE STARTED 24.01.2013		DATE COMPLETED _____		RIYADH		SAUDI ARABIA		DRAWING NUMBER		SHEET NO.	
PRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC						CD-322990		REV. NO.	
REV. NO.		DATE		DESCRIPTION				CD-322990		01	
01		13 49		FACTORY ASBUILT							
00		13 04		FOR APPROVAL							





	1	2	3	4	5	6	7	8	9	10
	SR. NO.	LOCATION REF.	SCH. REF.	D E S C R I P T I O N		SHT NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
A	17		X3	SPRING LOADED TERMINAL BLOCKS FOR AC SUPPLY		301	10	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
			X4	SPRING LOADED TERMINAL BLOCK FOR DC CIRCUIT		301	10	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
			X5	SPRING LOADED TERMINAL BLOCK FOR CONTROL CIRCUIT		301	20	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
			X6	SPRING LOADED TERMINAL BLOCK FOR ALARM CIRCUIT		301	5	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
			X61	SPRING LOADED TERMINAL BLOCK FOR STN.-COM ALARM PANEL		301	10	M6/8 SNB	ENTRELEC	1SNA 115 688 R2500
			XSH	SPRING LOADED TERMINAL BLOCK FOR SPACE HEATER		301	2	M6/8.RS	ENTRELEC	1SNA 115 688 R2500
B			XTJ	SPRING LOADED TERMINAL BLOCK FOR TELEPHONE JACK		301	5	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
C										
D										
E										
F										

AS-BUILT BY _____ DATE _____		CONTRACT NO. <b>11131113/00</b>	JOB ORDER NO. <b>S-13656</b>	<b>LIST OF APPARATUS</b>		الشركة الوطنية لنقل الكهرباء		 <b>نقل الكهرباء</b> National Grid sa	
<b>01</b>	<b>13 49</b>	<b>FACTORY ASBUILT</b>		DRAWN BY <b>RIZ</b>	CHECKED BY <b>KVR</b>	<b>132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1</b>		INDEX	PLANT NO.
<b>00</b>	<b>13 04</b>	<b>FOR APPROVAL</b>		DATE STARTED <b>24.01.2013</b>	DATE COMPLETED _____	<b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b>		DRAWING NUMBER	SHEET NO.
REV. NO.	DATE	DESCRIPTION		OPRG. DEPT. <b>CTPD</b>	ENG. DEPT. <b>AUT-PSAC</b>	<b>RIYADH SAUDI ARABIA</b>		<b>- C421</b>	<b>CD-322990</b>
								<b>L03</b>	<b>L04</b>
									<b>01</b>

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LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
U05.5001	U05.5001 878+508F-1/CU	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U12.101	U12.101 1S-CU	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U12.107	U12.107 R0188	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U12.113	U12.113 740C-1/CU	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U16.5001	U16.5001 1PB1	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U16.5002	U16.5002 1PB2	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U16.5003	U16.5003 S01	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U16.5004	U16.5004 S02	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5001	U39.5001 DC SUPPLY MCB FOR CU	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5002	U39.5002 COT-127V,C02-220V	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5003	U39.5003 1J	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm

AS-BUILT BY _____ DATE _____		CONTRACT NO. <b>11131113/00</b>	JOB ORDER NO. <b>S-13656</b>	<b>LIST OF APPARATUS</b>		نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid sa	
<b>01</b>	<b>13 49</b>	<b>FACTORY ASBUILT</b>		DRAWN BY <b>RIZ</b>	CHECKED BY <b>KVR</b>	<b>132KV BUSBAR PROT.N.MAIN-1 CU PANEL +8BP1-1</b> <b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b> <b>RIYADH SAUDI ARABIA</b>	
<b>00</b>	<b>13 04</b>	<b>FOR APPROVAL</b>		DATE STARTED <b>24.01.2013</b>	DATE COMPLETED _____	INDEX <b>-</b>	PLANT NO. <b>C421</b>
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. <b>CTPD</b>	ENG. DEPT. <b>AUT-PSAC</b>	DRAWING NUMBER	SHEET NO. <b>L04</b>	CONT. <b>L05</b>
					<b>CD-322990</b>	REV. NO. <b>01</b>	

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A										
B										
C										
D										
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G										

LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
C1	C1 127V AC SUPPLY MCB	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C2	C2 220V AC SUPPLY MCB	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C3	C3 THERMOSTAT	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C7	C7 ON/OFF SWITCH	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
DS	DS DOOR SWITCH	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
IL	IL ILLUMINATION LAMP	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
SH	SH SPACE HEATER	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm

AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	LIST OF APPARATUS		الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
01	13 49	FACTORY ASBUILT		DRAWN BY RIZ CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1		National Grid sa	
00	13 04	FOR APPROVAL		DATE STARTED 24.01.2013 DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		SHT CONT.	
REV. NO.	DATE	DESCRIPTION		OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA		01	
INDEX	PLANT NO.	DRAWING NUMBER		SHEET NO.		REV. NO.			
-	C421	CD-322990		L05NIL					

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POWER SYSTEMS NETWORK MANAGEMENT  
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS  
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.  
414, AL-KHARJ ROAD  
SECOND INDUSTRIAL CITY  
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company  
CLIENT : National GridSA  
PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY  
SUBSTATION : S/S 8709  
CONTRACT NO. : 11131113/00  
TITLE : SCHEMATICS DRAWINGS - +BBP1-1  
[132KV BUSBAR PROTECTION MAIN-1 CENTRAL UNIT PANEL]

AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	COVER SHEET		الشركة الوطنية لنقل الكهرباء نقل الكهرباء National Grid SA				
01	13 49	FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY KVR	132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1	INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.
00	13 04	FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED	S/S 8709 - 132/13.8KV IN AL-KHARJ CITY	-	C421	CD-322991	SHT CONT.	01
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH	SAUDI ARABIA				



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<table><tr><th>SYMBOL</th><th>DESCRIPTION</th><th>SYMBOL</th><th>DESCRIPTION</th><th>SYMBOL</th><th>DESCRIPTION</th></tr><tr><td></td><td>FRAME CONNECTION</td><td></td><td>MAIN CONTACT OF A CIRCUIT BREAKER PASSING MAKE CONTACT CLOSING MOMENTARILY DURING OPERATION AND RELEASE</td><td></td><td>RELAY WITH TWO MAKE CONTACTS, ONE OF THEM DELAYED WHEN OPERATING</td></tr><tr><td></td><td>EARTH CONNECTION</td><td></td><td>BREAK CONTACT DELAYED WHEN OPERATING</td><td></td><td>RELAY WITH TWO ACTUATORS AND A TWO STABLE POSITIONS</td></tr><tr><td></td><td>RESISTOR</td><td></td><td>MAKE CONTACT DELAYED WHEN RELEASING</td><td></td><td>SIGNALLING LAMP</td></tr><tr><td></td><td>VARIABLE RESISTOR</td><td></td><td>TWO MECHANICAL LINKS CROSSING WITHOUT CONNECTION</td><td></td><td>MECHANICAL INDICATOR WITH AUTOMATIC RESET</td></tr><tr><td></td><td>RESISTOR WITH PRESET ADJUSTMENT</td><td></td><td>JUNCTION OF MECHANICAL LINKS</td><td></td><td>MECHANICAL INDICATOR WITH NON-AUTOMATIC 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AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		GRAPHICAL SYMBOLS FOR DIAGRAMS		الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		INDEX		PLANT NO.	
DATE STARTED 24.01.2013		DATE COMPLETED		RIYADH		SAUDI ARABIA		DRAWING NUMBER		SHEET NO.	
PRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC						CD-322991		011 012	
REV. NO.		DATE		DESCRIPTION						REV. NO.	
01		13 49		FACTORY ASBUILT						01	
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AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		GRAPHICAL SYMBOLS FOR DIAGRAMS			نقل الكهرباء		
DRAWN BY RIZ CHECKED BY KVR			132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1			الشركة الوطنية لنقل الكهرباء			National Grid sa			
DATE STARTED 24.01.2013 DATE COMPLETED _____			S/S 8709 - 132/13.8KV IN AL-KHARJ CITY			INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.	REV. NO.		
PRG. DEPT. CTPD ENG. DEPT. AUT-PSAC			RIYADH SAUDI ARABIA			-	C421	CD-322991	012 013	01		
REV. NO.	DATE	DESCRIPTION										
01	13 49	FACTORY ASBUILT										
00	13 04	FOR APPROVAL										



## LEGENDS

±R1	DC SUPPLY - MAIN PROTECTION
±R2	DC SUPPLY - SECONDARY PROTECTION
±R3	DC SUPPLY - BACK UP PROTECTION
±IT	DC SUPPLY - INTER TRIP
FL	DC SUPPLY - FLASHING CIRCUIT
BB RS±	DC SUPPLY - BUS BAR - PROTECTION RESET
BB CBF±/CBF±	DC SUPPLY - CBF PROTECTION
R	RESET BUS - ALARM SYSTEM
CR	CONTROL ROOM
ECC	ENERGY CONTROL CENTRE
LOCAL	THE LOCATION OF CONTROLLED DEVICE
REMOTE	ANY OTHER LOCATION NOT LOCAL
ON	CB NORMALLY OPEN AUXILIARY CONTACT
OFF	CB NORMALLY CLOSED AUXILIARY CONTACT
A	COMMON
T	TEST POSITION
S	SERVICE POSITION
CS	CLOSE IN SERVICE POSITION
CT	CLOSE IN TEST POSITION
LS	LOCAL SERVICE
LT	LOCAL TEST
LC	LOCAL CLOSE
LO	LOCAL OPEN
RO	REMOTE OPEN

## NOTES

### LABELS

WHITE LABEL WITH BLACK LETTERING WILL BE PROVIDED FOR ALL MOUNTED APPARATUS EQUIPMENT IDENTIFICATION AND FUNCTION REFERENCE LABEL WILL BE PROVIDED FOR FRONT MOUNTED EQUIPMENTS OF THE PANEL AND EQUIPMENT IDENTIFICATION LABEL WILL BE PROVIDED FOR INTERNALLY MOUNTED EQUIPMENTS

### LUGS

A. CT CIRCUITS- RING TYPE  
B. OTHER CIRCUITS - SPADE TYPE


### FERULLING

YELLOW TUBE 3.2 mm FOR 1.5SQ mm WIRES AND 4.2 FOR 2.5 SQ mm WIRES  
( AS PER 31 - TMSS-1, RE.0 )

AS-BUILT BY _____ DATE _____		CONTRACT NO. <b>11131113/00</b>		JOB ORDER NO. <b>S-13656</b>		<b>COMMON LEGENDS</b>		نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid sa	
DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>		DATE STARTED <b>24.01.2013</b> DATE COMPLETED _____		132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO. - C421 CD-322991 013 014 01	
PRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>		SAUDI ARABIA		RIYADH					



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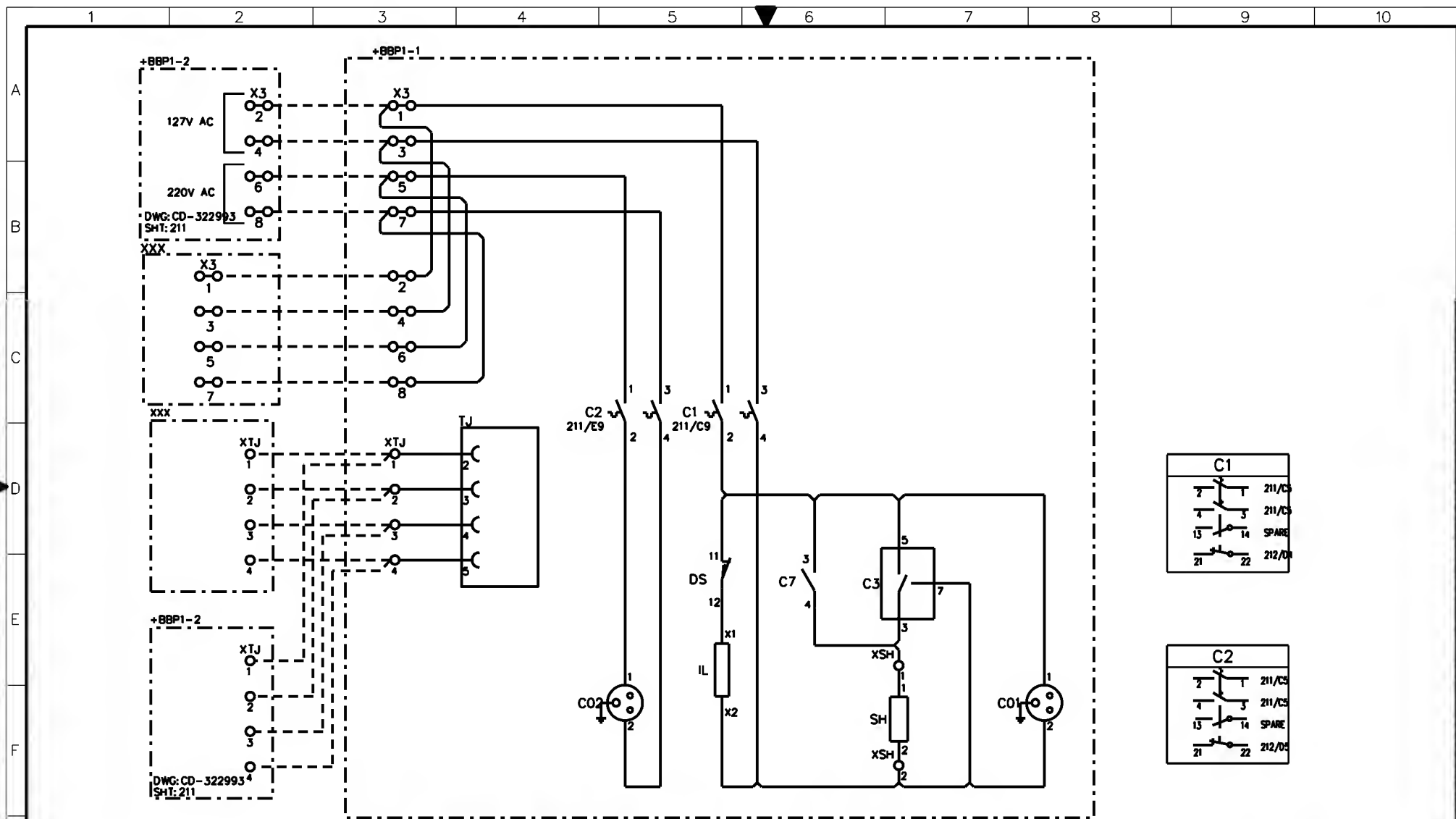


**ABB**  
PROTECTION & SUBSTATION  
AUTOMATION

MANUFACTURER	SCHEMATICS OWG.NO	PANEL DESCRIPTION	PANEL REFERENCE
		SS 8709 132kV RELAY PANELS	
		132/13.8kV GT-1 RELAY PANEL -1	+R05.1
	CD-322928	132/13.8kV GT-1 RELAY PANEL -2	+R05.2
		132/13.8kV GT-2 RELAY PANEL -1	+R01.1
	CD-322931	132/13.8kV GT-2 RELAY PANEL -2	+R01.2
		132/13.8kV GT-3 RELAY PANEL -1	+R04.1
	CD-322934	132/13.8kV GT-3 RELAY PANEL -2	+R04.2
	CD-322936	132/13.8kV TRANSFORMER-1,2& 3 AVC PANEL	+AVC
		132KV SPARE-1 UGF RELAY PANEL -1	+R07.1
	CD-322922	132KV SPARE-1 UGF RELAY PANEL -2	+R07.2
		132KV 8020 UGF RELAY PANEL -1	+R02.1
	CD-322916	132KV 8020 UGF RELAY PANEL -2	+R02.2
		132KV 8710 UGF RELAY PANEL -1	+R03.1
	CD-322919	132KV 8710 UGF RELAY PANEL -2	+R03.2
		132KV SPARE-2 UGF RELAY PANEL -1	+R06.1
	CD-322925	132KV SPARE-2 UGF RELAY PANEL -2	+R06.2
	CD-323012	132KV FOP PANEL	+FOP
	CD-322946	132kV BUS COUPLER-A	+R130
	CD-322948	132kV BUS COUPLER-B	+R230
	CD-322950	132kV BUS SECTION	+R120
	CD-322991	132kV BUSBAR PROTECTION MAIN-1 CENTRAL UNIT PANEL	+BBP1-1
	CD-322993	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BBP1-2
	CD-322995	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BBP1-3
	CD-322997	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BBP1-4
	CD-322999	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BBP1-5
	CD-323001	132kV BUSBAR PROTECTION MAIN-2 CENTRAL UNIT PANEL	+BBP2-1
	CD-323003	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BBP2-2
	CD-323005	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BBP2-3
CD-323007	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BBP2-4	
CD-323009	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BBP2-5	

AS-BUILT BY _____ DATE _____		CONTRACT NO. <b>11131113/00</b>	JOB ORDER NO. <b>S-13656</b>	<b>DRAWING REFERENCES</b>		نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid sa								
<b>01</b>	<b>13 49</b>	<b>FACTORY ASBUILT FOR APPROVAL</b>	DRAWN BY <b>RIZ</b>	CHECKED BY <b>KVR</b>	<b>132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1</b>	<b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b>	<b>RIYADH</b>	<b>SAUDI ARABIA</b>	<b>-</b>	<b>C421</b>	<b>CD-322991</b>	<b>015</b>	<b>016</b>	<b>01</b>
<b>00</b>	<b>13 04</b>		DATE STARTED <b>24.01.2013</b>	DATE COMPLETED _____										
REV. NO.	DATE	DESCRIPTION	PRG. DEPT. <b>CTPO</b>	ENG. DEPT. <b>AUT-PSAC</b>										

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<table><tr><td colspan="3">AS-BUILT BY _____ DATE _____</td><td colspan="2">CONTRACT NO. 11131113/00</td><td colspan="2">JOB ORDER NO. S-13656</td><td colspan="2">DRAWING REFERENCES</td><td colspan="2">الشركة الوطنية لنقل الكهرباء National Grid sa</td></tr><tr><td>01</td><td>13 49</td><td>FACTORY ASBUILT</td><td colspan="2">DRAWN BY RIZ</td><td colspan="2">CHECKED BY KVR</td><td colspan="2">132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1</td><td colspan="2">INDEX</td></tr><tr><td>00</td><td>13 04</td><td>FOR APPROVAL</td><td colspan="2">DATE STARTED 24.01.2013</td><td colspan="2">DATE COMPLETED _____</td><td colspan="2">S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</td><td colspan="2">PLANT NO.</td></tr><tr><td>REV. NO.</td><td>DATE</td><td>DESCRIPTION</td><td colspan="2">OPRG. DEPT. CTPD</td><td colspan="2">ENG. DEPT. AUT-PSAC</td><td colspan="2">RIYADH SAUDI ARABIA</td><td colspan="2">DRAWING NUMBER</td></tr><tr><td colspan="3"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">-</td></tr><tr><td colspan="3"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">C421</td></tr><tr><td colspan="3"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">CD-322991</td></tr><tr><td colspan="3"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">SHT CONT.</td></tr><tr><td colspan="3"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">016 211</td></tr><tr><td colspan="3"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">01</td></tr></table>											AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		DRAWING REFERENCES		الشركة الوطنية لنقل الكهرباء National Grid sa		01	13 49	FACTORY ASBUILT	DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1		INDEX		00	13 04	FOR APPROVAL	DATE STARTED 24.01.2013		DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		PLANT NO.		REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA		DRAWING NUMBER											-											C421											CD-322991											SHT CONT.											016 211											01	
AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		DRAWING REFERENCES		الشركة الوطنية لنقل الكهرباء National Grid sa																																																																																																															
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00	13 04	FOR APPROVAL	DATE STARTED 24.01.2013		DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		PLANT NO.																																																																																																															
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA		DRAWING NUMBER																																																																																																															
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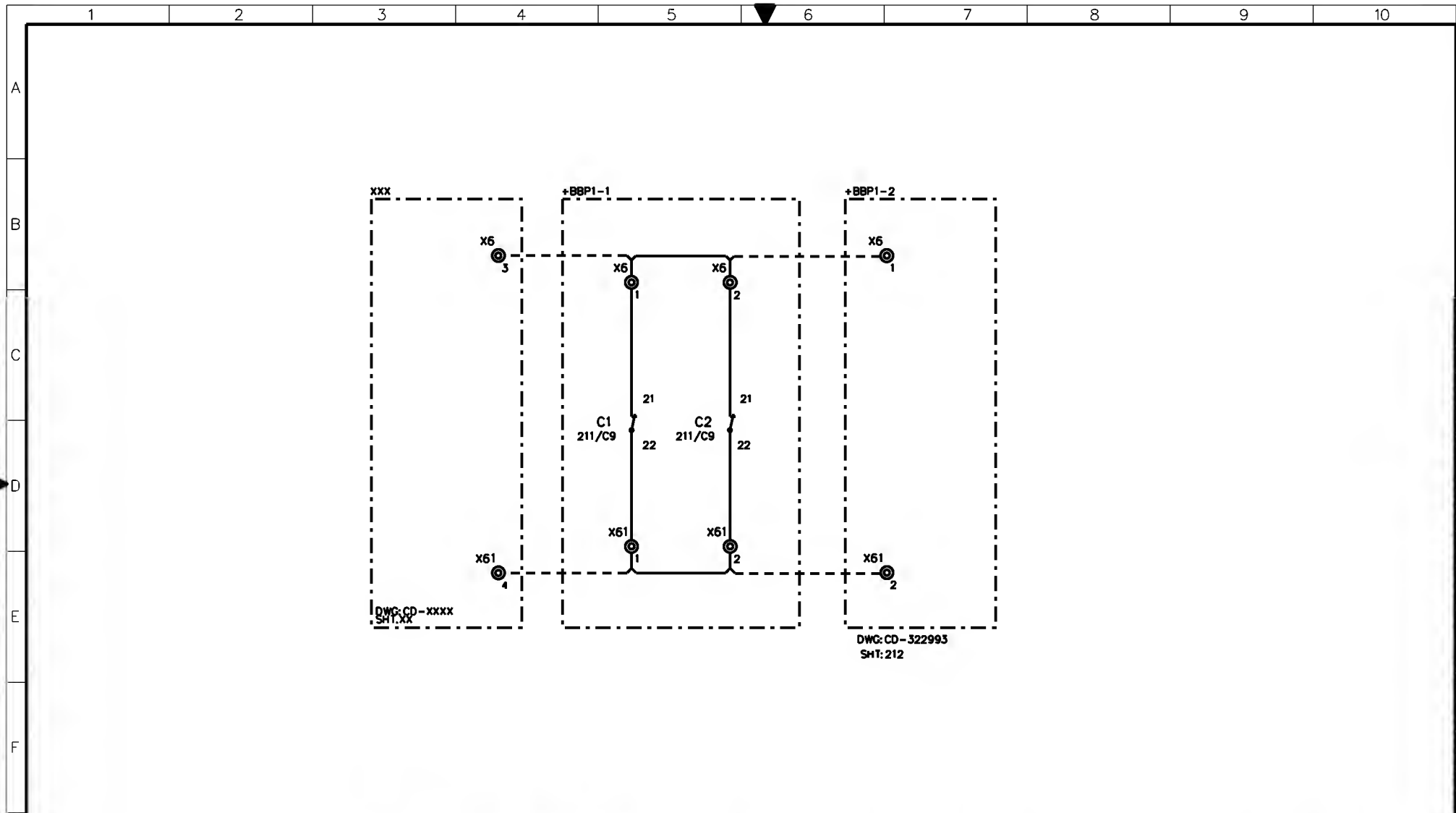


AS-BUILT BY \_\_\_\_\_ DATE \_\_\_\_\_ CONTRACT NO. 1113113/00 JOB ORDER NO. S-13656

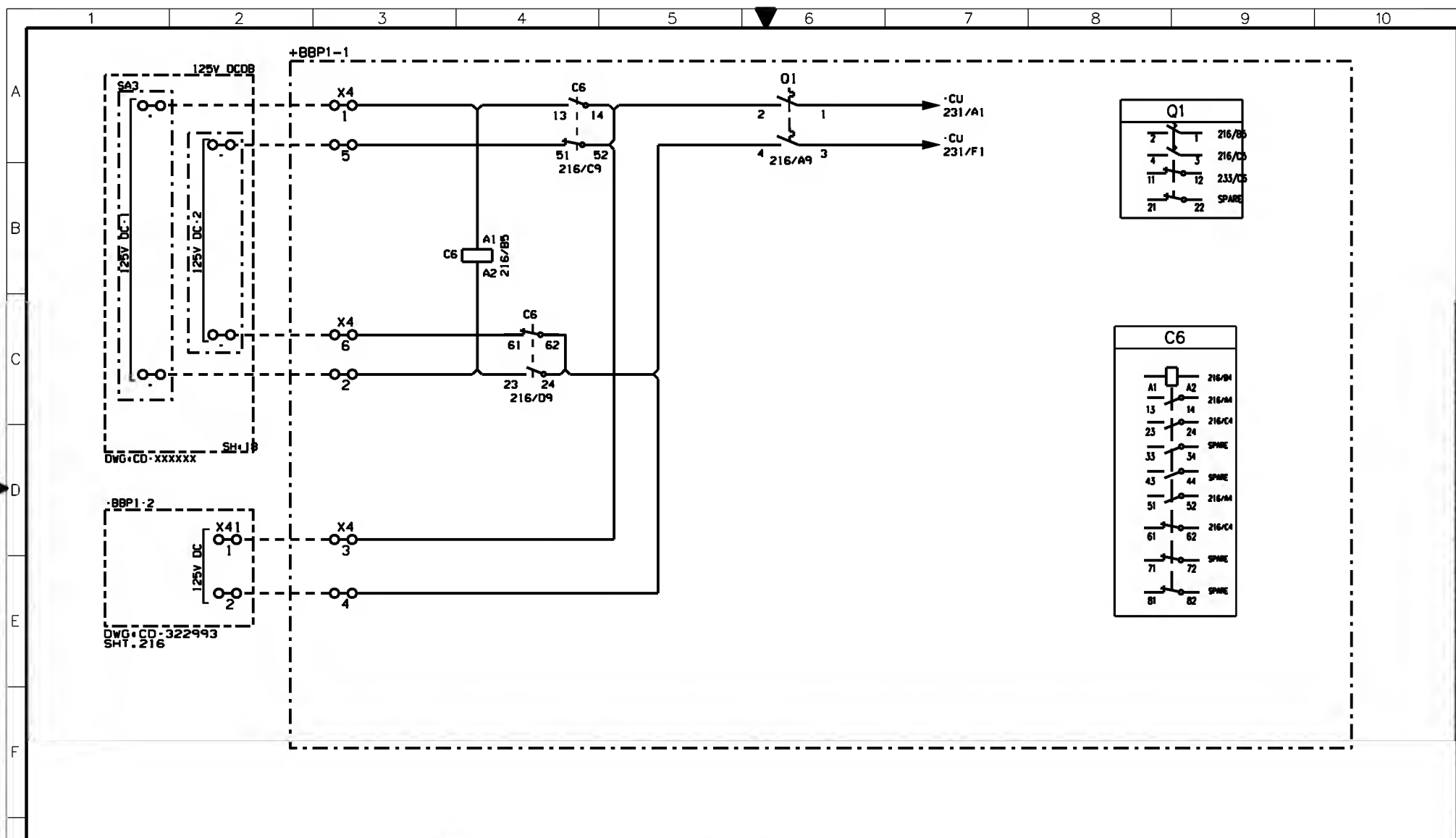
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00	13 04	FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED
REV. NO.	DATE	DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC

**AC SUPPLY FOR ILLUMINATION & POWER SOCKET**  
**132KV BUSBAR PROT.N.MAIN-1 CU PANEL +BBP1-1**  
**S/S 8709 - 132/13.8KV IN AL-KHARJ CITY**  
**RIYADH SAUDI ARABIA**

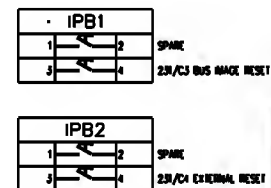
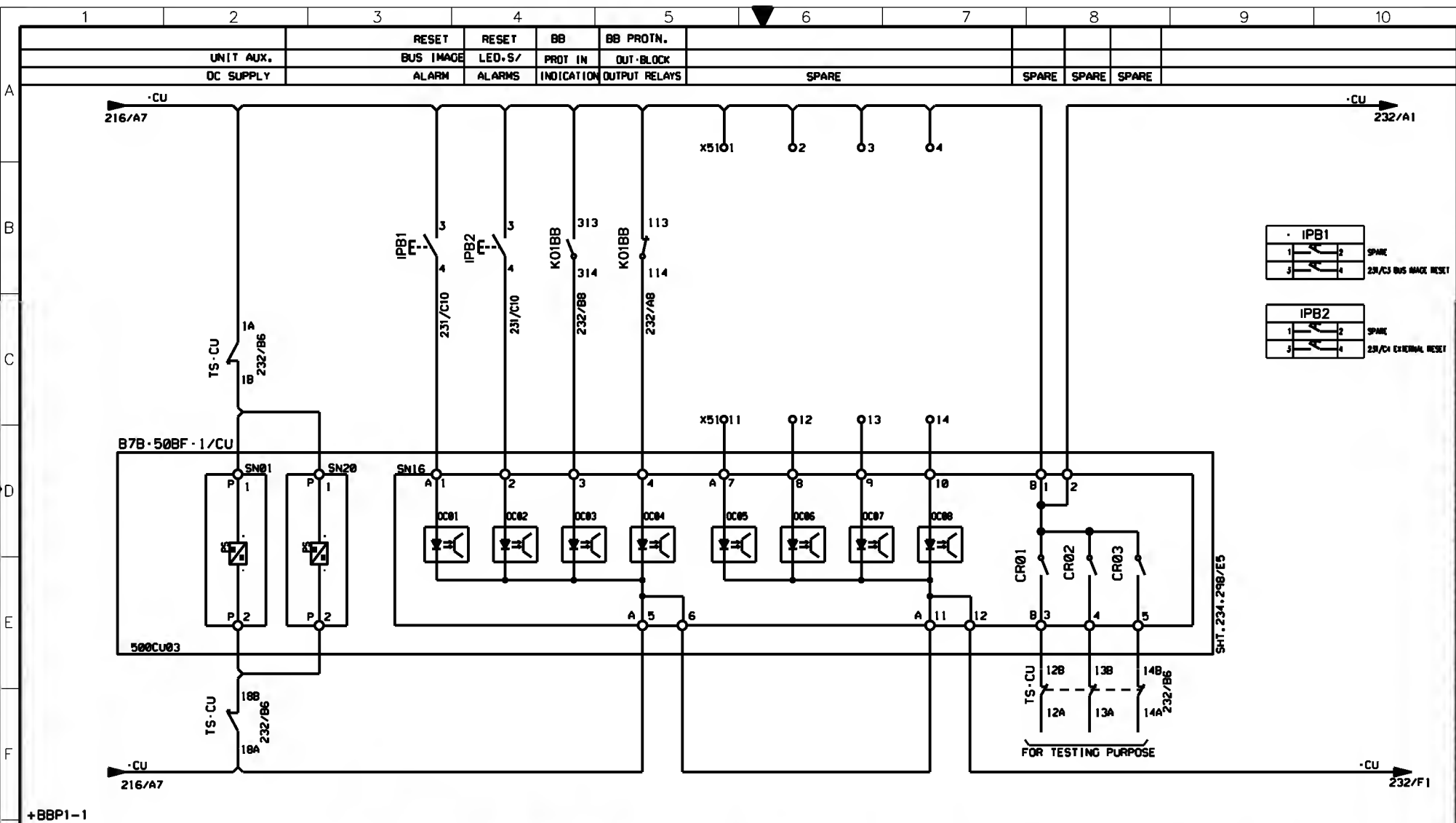
الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
National Grid sa		National Grid sa	
INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.
-	C421	CD-322991	211 212
		REV. NO.	01



AS-BUILT BY _____ DATE _____			CONTRACT NO. <b>1113113/00</b>		JOB ORDER NO. <b>S-13656</b>		<b>AC SUPPLY AUXILIARY CONTACTS</b>				الشركة الوطنية لنقل الكهرباء			
DRAWN BY <b>RIZ</b> CHECKED BY <b>KVR</b>			DATE STARTED <b>24.01.2013</b> DATE COMPLETED _____		DATE STARTED _____ DATE COMPLETED _____		<b>132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1</b>				National Grid sa			
FOR APPROVAL			DATE STARTED _____ DATE COMPLETED _____		DATE STARTED _____ DATE COMPLETED _____		<b>S/S 8709 - 132/13.8KV IN AL-KHARJ CITY</b>				INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO.			
PRG. DEPT. <b>CTPD</b> ENG. DEPT. <b>AUT-PSAC</b>			PRG. DEPT. _____ ENG. DEPT. _____		PRG. DEPT. _____ ENG. DEPT. _____		<b>RIYADH SAUDI ARABIA</b>				<b>- C421 CD-322991 212 216 01</b>			

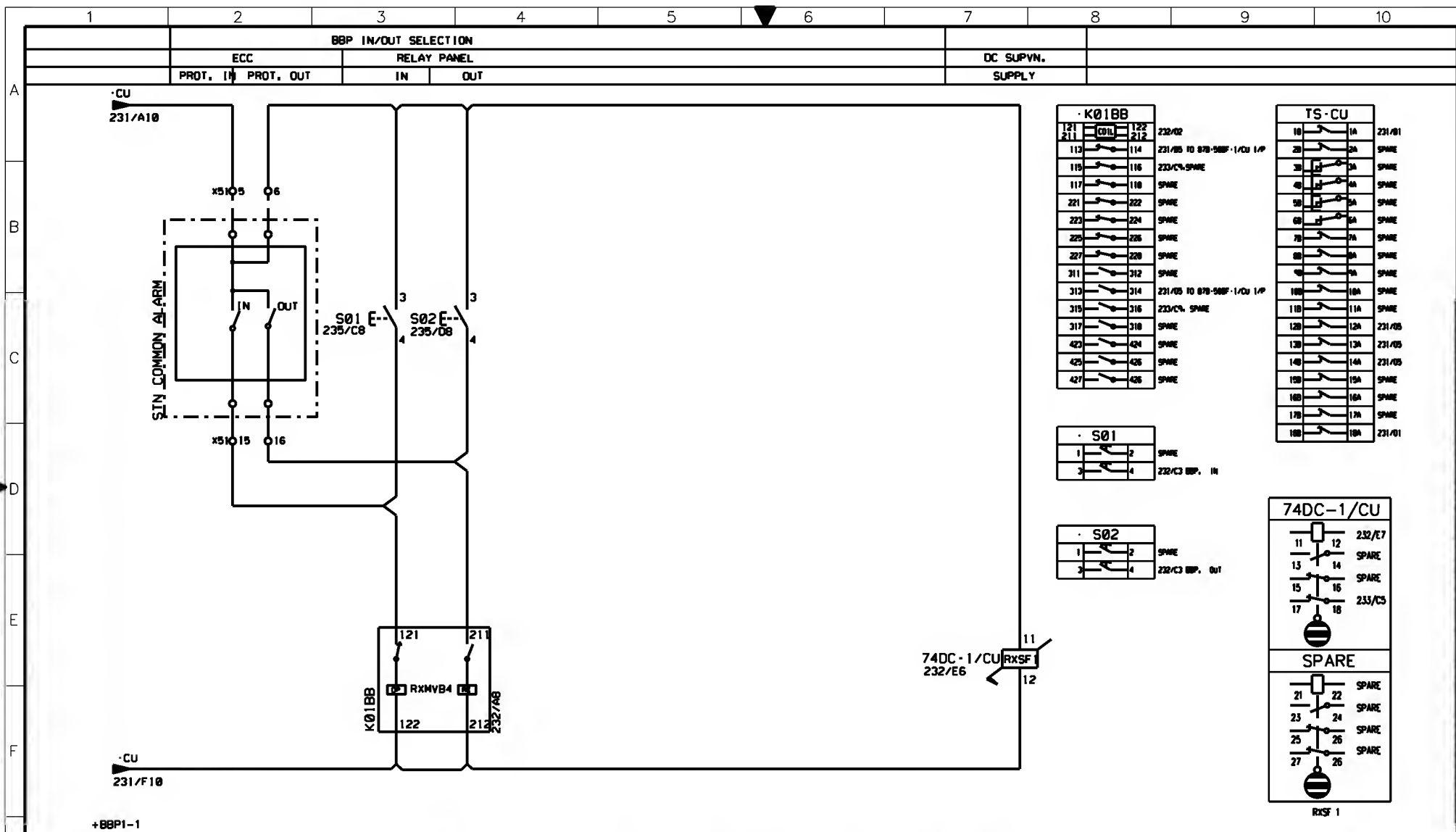


AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		DC SUPPLY DISTRIBUTION-R1			نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid sa				
DRAWN BY RIZ CHECKED BY KVR			132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1			S/S 8709 - 132/13.8KV IN AL-KHARJ CITY			INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO.					
DATE STARTED 24.01.2013 DATE COMPLETED _____			S/5 8709 - 132/13.8KV IN AL-KHARJ CITY			RIYADH SAUDI ARABIA			- C421 CD-322991 216/231 01					
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC														
REV. NO. DATE DESCRIPTION														
01 13 49 FACTORY ASBUILT														
00 13 04 FOR APPROVAL														



AS-BUILT BY _____ DATE _____		CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	87B-50BF-1/CU PROTECTION RELAY - BINARY INPUTS		الشركة الوطنية لنقل الكهرباء	
DRAWN BY RIZ CHECKED BY KVR		DATE STARTED 24.01.2013 DATE COMPLETED _____		132KV BUSBAR PROT.N.MAIN-1 CU PANEL +BBP1-1		National Grid sa	
DATE STARTED 24.01.2013 DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		INDEX PLANT NO. C421		DRAWING NUMBER CD-322991	
PRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA		SHEET NO. 231/232		REV. NO. 01	

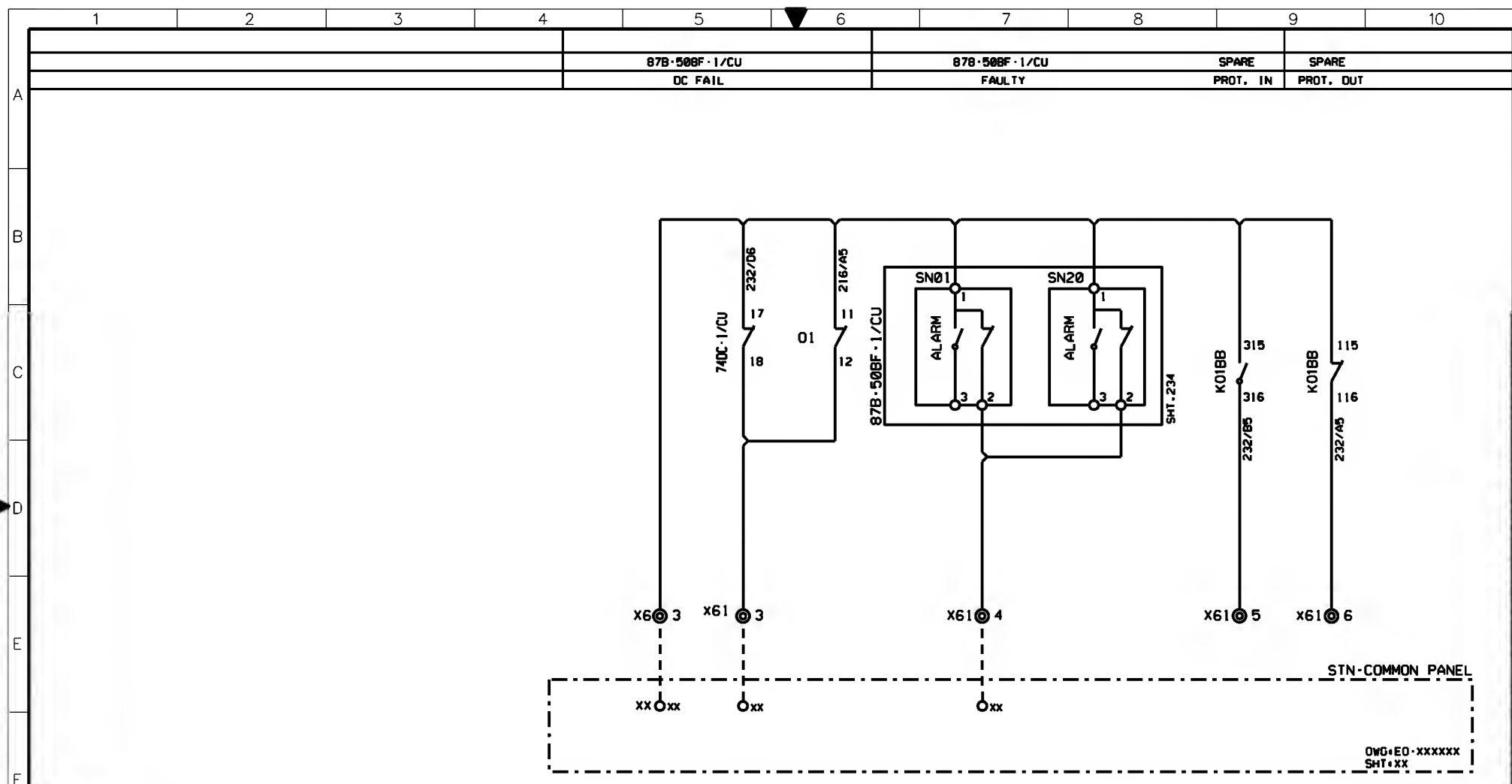




AS-BUILT BY _____		DATE _____	CONTRACT NO. 1113113/00	JOB ORDER NO. S-13656
01	13 49	FACTORY ASBUILT		DRAWN BY RIZ CHECKED BY KVR
00	13 04	FOR APPROVAL		DATE STARTED 24.01.2013 DATE COMPLETED _____
REV. NO.	DATE	DESCRIPTION		OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

BBP IN/OUT SELECTION CIRCUIT	
132KV BUSBAR PROT.N.MAIN-1 CU PANEL +BBP1-1	
S/S 8709 - 132/13.8KV IN AL-KHARJ CITY	
RIYADH SAUDI ARABIA	

الشركة الوطنية لنقل الكهرباء		نقل الكهرباء	
National Grid sa		National Grid sa	
INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO.
-	C421	CD-322991	232/233
			REV. NO.
			01



+BBP1-1

AS-BUILT BY

DATE

CONTRACT NO.

11131113/00

JOB ORDER NO.

S-13656

01

13 49

FACTORY ASBUILT

00

13 04

FOR APPROVAL

REV. NO.

DATE

DESCRIPTION

DRAWN BY

RIZ

CHECKED BY

KVR

DATE STARTED

24.01.2013

DATE COMPLETED

OPRG. DEPT.

CTPD

ENG. DEPT.

AUT-PSAC

STATION COMMON ALARM CIRCUITS

132KV BUSBAR PROTN,MAIN-1 CU PANEL +BBP1-1

S/S 8709 - 132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

شركة الوطنية لنقل الكهرباء

نقل الكهرباء

National Grid sa

INDEX

PLANT NO.

DRAWING NUMBER

SHEET NO.

SHT. CONT.

REV. NO.

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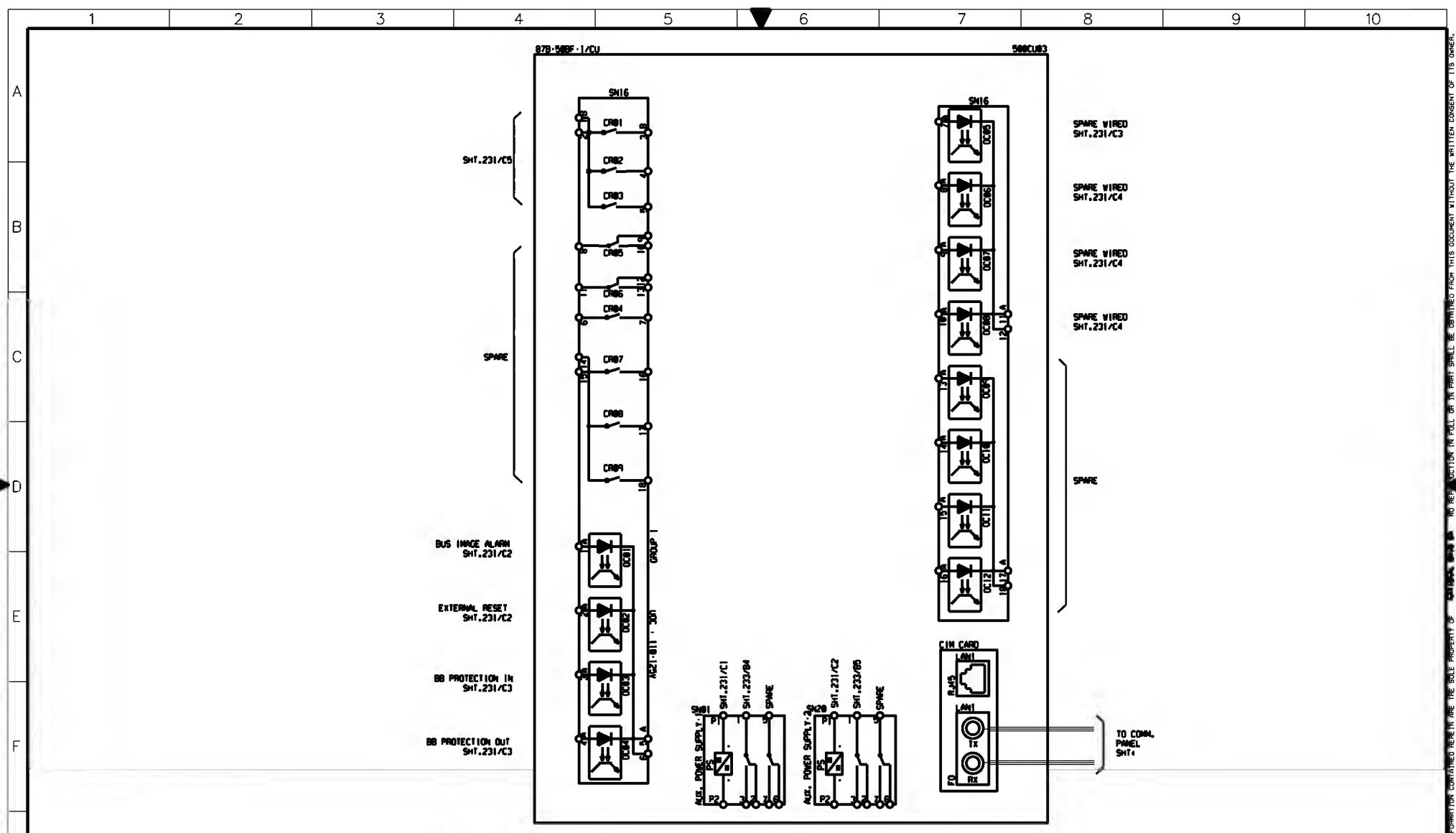
C421

CD-322991

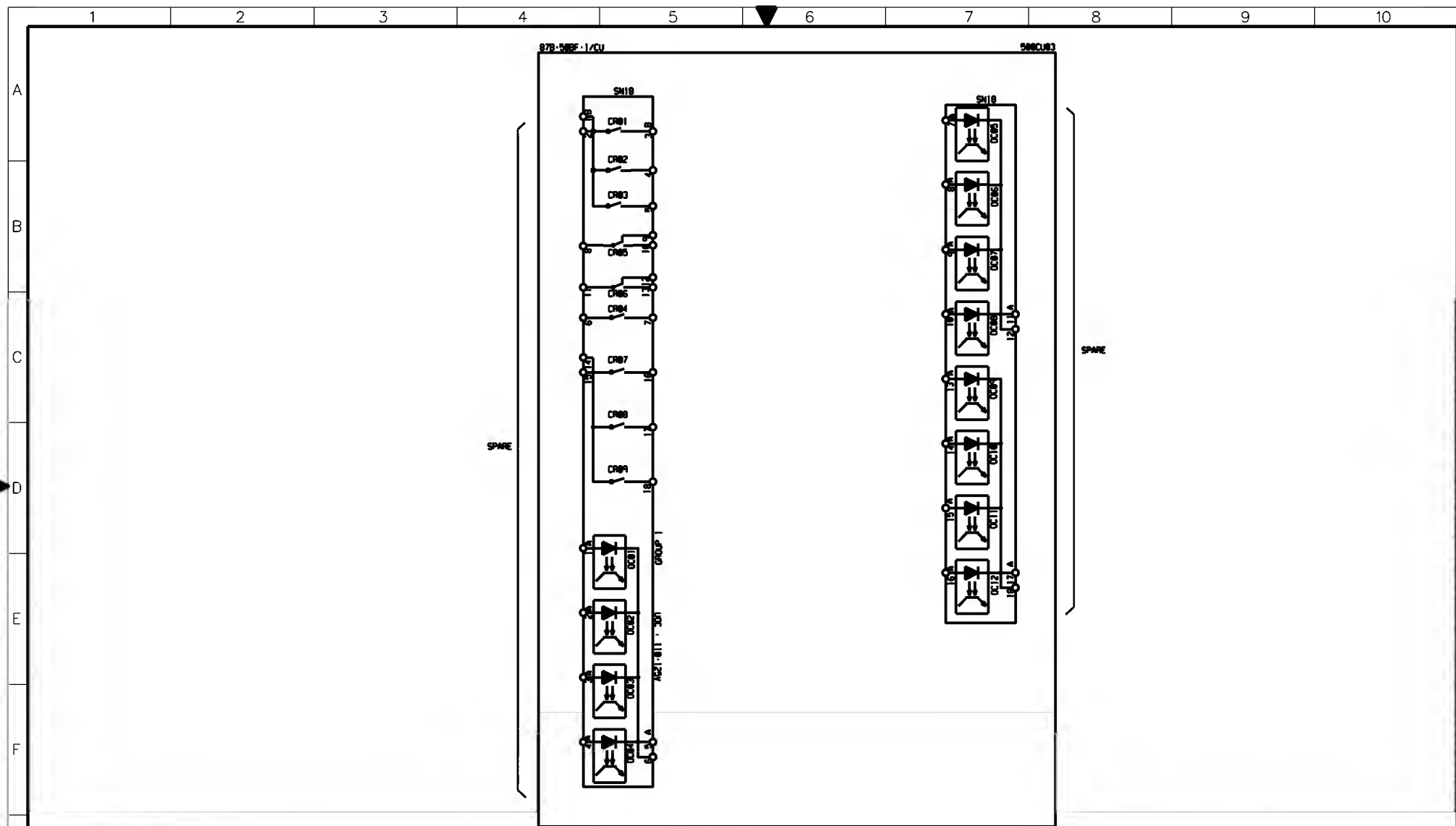
233/234

01





AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		87B+50BF-1/CU INTERNAL DIAGRAM			الشركة الوطنية لنقل الكهرباء			
DRAWN BY RIZ CHECKED BY KVR			DATE STARTED 24.01.2013 DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		R/1YADH			National Grid sa			
PRG. DEPT. CTPD ENG. DEPT. AUT-PSAC			INDEX -		PLANT NO. C421		DRAWING NUMBER CD-322991			SHEET NO. 298			
REV. NO. 01			DATE 13 49		DESCRIPTION FACTORY ASBUILT		SHEET CONT. 299			REV. NO. 01			
FOR APPROVAL													



AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		87B+50BF-1/CU INTERNAL DIAGRAM		الشركة الوطنية لنقل الكهرباء			نقل الكهرباء						
			DRAWN BY RIZ CHECKED BY KVR				132KV BUSBAR PROTN.MAIN-1 CU PANEL +BBP1-1		INDEX		PLANT NO.		DRAWING NUMBER		SHEET NO.		REV. NO.	
01 13 49			FACTORY ASBUILT		DATE STARTED 24.01.2013 DATE COMPLETED		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY		-		C421		CD-322991		299/301		01	
00 13 04			FOR APPROVAL				RIYADH SAUDI ARABIA											
REV. NO.			DATE		DESCRIPTION		OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC											

	1	2	3	4	5	6	7	8	9	10
A										
B										
C										
D										
E										
F										

INTERNAL REFERENCE	
211/A2	1
211/A5	2
211/A2	3
211/A5	4
211/A2	5
211/A5	6
211/A2	7
211/A5	8
SPARE	9
SPARE	10

X3 AC CKT.	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

INTERNAL REFERENCE	
216/A3	1
216/C3	2
216/D3	3
216/E3	4
216/A3	5
216/C3	6
SPARE	7
SPARE	8
SPARE	9
SPARE	10

X4 DC CKTS	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

INTERNAL REFERENCE	
231/A5	1
231/A6	2
231/A6	3
231/A7	4
232/B2	5
232/B2	6
SPARE	7
SPARE	8
SPARE	9
SPARE	10
231/C5	11
231/C6	12
231/C6	13
231/C7	14
232/D2	15
232/D2	16
SPARE	17
SPARE	18
SPARE	19
SPARE	20

X5 CONTROL & PROT.	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20

INTERNAL REFERENCE	
212/E5	1
212/E6	2
233/E5	3
233/E5	4
233/E7	5
233/E9	6
233/E9	7
SPARE	8
SPARE	9
SPARE	10

X61 ALARM CKTS	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

INTERNAL REFERENCE	
211/B2	1
211/B2	2
211/B2	3
211/B2	4
SPARE	5

XTJ T.JACK	
1	1
2	2
3	3
4	4
5	5

INTERNAL REFERENCE	
211/E7	1
211/F7	2
SPARE	3
SPARE	4
SPARE	5

XSH SPACEHEATER	
1	1
2	2
3	3
4	4
5	5

INTERNAL REFERENCE	
212/B5	1
212/B5	2
SPARE	3
SPARE	4
SPARE	5

X6 ALARM CKTS	
1	1
2	2
3	3
4	4
5	5

AS-BUILT BY _____ DATE _____			CONTRACT NO. 11131113/00		JOB ORDER NO. S-13656		TERMINAL BLOCK ALLOCATION				نقل الكهرباء الشركة الوطنية لنقل الكهرباء National Grid SA				
			DRAWN BY RIZ		CHECKED BY KVR		132KV BUSBAR PROTN.MAIN-1 CU PANEL +88PI-1								
01 13 49 FACTORY ASBUILT			DATE STARTED 24.01.2013		DATE COMPLETED _____		S/S 8709 - 132/13.8KV IN AL-KHARJ CITY								
00 13 04 FOR APPROVAL			OPRG. DEPT. CTPD		ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA								
REV. NO. DATE DESCRIPTION											INDEX PLANT NO. DRAWING NUMBER SHEET NO. REV. NO.				
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